AMENDMENT OF THE SPECIFICATION

Please amend the Title of the Invention, as follows:

CaO-SiO_2-BASED BIOACTIVE GLASS AND SINTERED CALCIUM PHOSPHATE [[GLASS]] USING SAME

Please replace the paragraph at page 1, lines 5-8, with the following amended paragraph:

The present invention relates to a CaO-SiO_2-based bioactive glass usable in bone restoration materials such as artificial joints, artificial dental roots and artificial bones, and a sintered calcium phosphate ~~glass~~ using the bioactive glass.

Please replace the paragraph at page 3, lines 1-4, with the following amended paragraph:

Accordingly, an object of the present invention is to provide a bioactive glass low in a glass transition temperature and/or a crystallization temperature, and a sintered calcium phosphate ~~glass~~ that uses the bioactive glass to have high biocompatibility and mechanical strength.

Please replace the paragraph at page 3, lines 7-13, with the following amended paragraph:

As a result of intensive research in view of the above object, the inventors have found that a bioactive glass comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO_2 and 20 mol % or less of Na_2O is low in a glass transition temperature and/or a crystallization temperature, and that a sintered calcium phosphate ~~glass~~ using the bioactive glass as a sintering aid is excellent in biocompatibility and mechanical strength. The present invention has been completed based on the findings.

Please replace the paragraph at page 4, lines 3-4, with the following amended paragraph:

A calcium phosphate contained in the sintered calcium phosphate ~~glass~~ of the present invention is preferably a hydroxyapatite, a carbonated apatite or tricalcium phosphate.

Please replace the paragraph at page 4, lines 25-26, with the following amended paragraph:

Fig. 5 is a graph showing the results of X-ray analysis of sintered calcium phosphate ~~glass~~ in Example 7;

Please replace the paragraph at page 4, lines 27-28, with the following amended paragraph:

Fig. 6 is a graph showing the results of X-ray analysis of sintered calcium phosphate ~~glass~~ in Example 8;

Please replace the paragraph at page 5 lines 10-17 with the following amended paragraph:

The bioactive glass of the present invention has a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO_2, and 20 mol % or less of Na_2O, and more preferably has a composition substantially comprising 40 to 50 mol % of CaO, 40 to 50 mol % of SiO_2, and 20 mol % or less of Na_2O. The glass with such a composition has bioactivity preferable for use as a bioactive material, and has mechanical strength, sinterability, etc. preferable for use as a sintering aid in a sintered calcium phosphate ~~glass~~.

Please replace the paragraph at page 5, line 24 to page 6, line 7 with the following amended paragraph:

The bioactive glass of the present invention comprises CaO and SiO_2 as main components with approximately equal molar ratios. Thus, the composition of the bioactive glass is substantially the same as that of the ß -wollastonite, whereby the bioactive glass easily generates ß-wollastonite crystals at a crystallization temperature.

The crystal generated at the crystallization temperature is preferably a ß-wollastonite crystal having a needle-like structure, because the mechanical strength of the sintered calcium phosphate ~~glass~~ is more increased by such a ß -wollastonite crystal as compared with other crystals. In the case of adding a large amount of P_2O_5 to improve biocompatibility by conventional methods, however, the formation of the ß-wollastonite crystal is often prevented at a crystallization temperature.

Please replace the paragraph at page 6, lines 18-22, with the following amended paragraph:

Crystals of tricalcium phosphate $Ca_3(PO_4)_2$ may be generated at the crystallization temperature. Tricalcium phosphate is similar in physical properties, solubility and biocompatibility, to hydroxyapatites. Further, the crystal of tricalcium phosphate can improve the biocompatibility of the sintered calcium phosphate ~~glass~~.

Please replace the paragraph at page 9, line 23 to page 10, line 7, with the following amended paragraph:

There are no particular restrictions in a method for producing the bioactive glass of the present invention. The bioactive glass may be produced by a method described in JP 60-239341 A, etc. Specifically, powders of materials (CaO, SiO_2, Na_2O, CaF_2, B_2O_3, etc.) with a desired composition are put in a platinum crucible and heated at 1,200°C to 1,600°C for approximately 3 hours to obtain a molten glass. The molten glass is molded

and annealed to produce the bioactive glass. Though not particularly restrictive, the shape of the bioactive glass may be selected in a shape of an ingot, a sphere, beads, particles, granules, etc. depending on the purposes. When the bioactive glass is used as a starting material for the sintered calcium phosphate ~~glass~~ of the present invention that will be described below, the diameter of the bioactive glass may be controlled by pulverization or classification.

Please replace the paragraph at page 10, lines 8 and 9, with the following amended paragraph:

[2] Sintered calcium phosphate ~~glass~~

(a) Composition of sintered calcium phosphate ~~glass~~

Please replace the paragraph at page 10, lines 10-12, with the following amended paragraph:

A calcium phosphate contained in the sintered calcium phosphate ~~glass~~ of the present invention is preferably a hydroxyapatite, a carbonated apatite or tricalcium phosphate.

Please replace the paragraph at page 10, lines 13-17, with the following amended paragraph:

When the hydroxyapatite is heated, it is gradually deprived of hydroxyl groups at around 1,000°C or higher, causing decomposition at around 1,300°C or higher. Thus, in the case of using the hydroxyapatite for the sintered calcium phosphate ~~glass~~, the sintering process is preferably carried out at a temperature lower than 1,000°C.

Please replace the paragraph at page 10, lines 18-25, with the following amended paragraph:

The biocompatibility of the sintered calcium phosphate ~~glass~~ may be further increased by using the carbonated apatite. The carbonate moieties of the carbonated apatite are eliminated at a temperature of around 900°C or higher, which is lower than the elimination temperature of the hydroxyl groups of the hydroxyapatite. Thus, in the case of using the carbonated apatite for the sintered calcium phosphate ~~glass~~, the sintering process is preferably carried out at a temperature lower than 900°C.

Please replace the paragraph at page 10, line 26 to page 11, line 3 with the following amended paragraph:

The sintered calcium phosphate ~~glass~~ of the present invention comprises the bioactive glass of the present invention as a sintering aid. The bioactive glass preferably generates the ß-wollastonite crystals at the crystallization temperature as shown in Fig.

2. The percentage of the generated ß-wollastonite crystals to the bioactive glass is preferably 10 to 100% by mass.

Please replace the paragraph at page 11, line 4, with the following amended paragraph:

(b) Method for producing sintered calcium phosphate ~~glass~~

Please replace the paragraph at page 11, lines 5-6, with the following amended paragraph:

The sintered calcium phosphate ~~glass~~ of the present invention may be produced by a common sintering method.

Please replace the paragraph at page 12, lines 12-25, with the following amended paragraph:

As shown in Fig. 3(d), when the sintering process proceeds and the green body is heated at a temperature at which at least part of the glass components forms crystals, crystals are generated in the grain boundary phase to form crystal phases. Because the sintering temperature is lower than the melting temperature and the decomposition temperature of the calcium phosphate throughout the sintering process, the calcium phosphate particles are hardly decomposed or dissolved in the glass. Thus, the crystals such as the ß-wollastonite crystals of certain glass components are generated between

the calcium phosphate crystals, to provide the sintered, dense calcium phosphate glass. The heating rate is preferably uniform, and preferred heating rate is approximately 10°C/min. The sintering temperature is preferably maintained between the glass transition temperature and the crystallization temperature for 1 to 5 hours. The sintered calcium phosphate ~~glass~~ is preferably cooled in a furnace.

Please replace the paragraph at page 20, line 12 to page 21, line 10 with the following amended paragraph:

As described in detail above, the bioactive glass of the present invention has a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO_2 and 20 mol % or less of Na_2O. By containing CaO and SiO_2 as main components, the bioactive glass easily generates the ß-wollastonite crystal at the crystallization temperature, resulting in excellent mechanical strength. By containing Na_2O, the bioactive glass has a low glass transition temperature and/or crystallization temperature. Further, when the bioactive glass of the present invention contains CaF_2 and/or B_2O_3, the difference between the glass transition temperature and the crystallization temperature is increased. The sintered calcium phosphate ~~glass~~ of the present invention comprises the bioactive glass as a sintering aid, thereby exhibiting high biocompatibility and excellent mechanical strength and sinterability. The present disclosure relates to subject matter contained in Japanese Patent Application No. 2002-206319 (filed on July 15, 2002) which is expressly incorporated herein by reference in its entirety.